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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/884,778	06/19/2001	Richard R. Hall	END920000187US1	2338

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EXAMINER	
DINH, TUAN T	

ART UNIT	PAPER NUMBER
2827	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/884,778	HALL ET AL.	
	Examiner	Art Unit	
	Tuan T Dinh	2827	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32 and 35-39* is/are pending in the application.

4a) Of the above claim(s) *1-20,25 and 26* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *21-24,27-32 and 35-39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 27, 31 are rejected under 35 U.S.C. 102(b) as being anticipated by Reimann (U. S. Patent 4,663,497).

As to claims 27, 31, Reimann discloses a structure for interconnection between circuit layers as shown in figures 1-14 comprising:

a laminate (22 and 34) having a conductive inner plane (24);

a conductive pad (24a) on a surface of the laminate, wherein a bottom surface of the conductive pad is in direct mechanical contact with the surface of the laminate (see figure 2a);

a conductive element (38-figure 5) having lower and upper portions, wherein the power portion is embedded into the laminate and the upper portion extends above the surface of the laminate (see figure 5), wherein the conductive pad circumscribes the upper portion of the conductive element (see figure 8), wherein the conductive element

electrically connects the conductive inner plane (24) to the surface of the laminate, wherein the power and upper portion (38) comprises conductive material selected from copper (column 4, lines 7-11).

3. Claim 37 is rejected under 35 U.S.C. 102(e) as being anticipated by Curcio et al. (U. S. Patent 6,504,111).

Curcio et al. discloses a structure as shown in figures 4-7 comprising:

a first laminate (12A, column 2, line 36) having a first conductive element (20A, column 2, line 51) embedded into the first laminate (into a through hole (14A), wherein a portion of the first conductive element forms at least one contact pad (22A, 22B, column 2, line 59) extending beyond a surface of the first laminate;

a second laminate (12B) having a second conductive element (20B) embedded into the second laminate (into a through hole (14B), wherein a portion of the second conductive element forms at least one contact pad (22C, 22D) extending beyond a surface of the second laminate; and

a bonding layer (32A; 32B; 32C, column 3, lines 27-56) between the first and second laminates, such that the contact pads (22A, 22C) are electrical connected, wherein the bonding layer comprises conductive metal filled epoxy (column 3, lines 27-56).

4. Claims 36, 38-39 are rejected under 35 U.S.C. 102(b) as being anticipated by Lloyd (U. S. Patent 3,601,523).

As to claim 36, Lloyd discloses a method of forming a conductive path within a laminate as shown in figures 1-6 comprising:

providing an opening (14, column 2, line 72) in the laminate (10, column 2, lines 65-67);

pressing a conductive element (15, column 3, line 9) into the opening (14) such that a portion of at least one end of the conductive element extends beyond a surface of the laminate (see figures 3-4);

applying a compressive pressure to the portion of the at least one end of the conductive element (column 3, lines 20-24) wherein the compressive pressure applied to the at least one end of the conductive element (15) forms a contact pad (35, 37, column 3, lines 36-38) extending beyond a surface of the laminate (10).

As claims 38-39, Lloyd discloses a method of forming a conductive path within a laminate (10, column 2, lines 65-67) as shown in figures 1-6 comprising:

providing a conductive element (conductor 15, column 3, line 9);

projecting the conductive element (15, column 3, lines 9-10) toward a surface of the laminate (see figure 2), the conductive element is sphere (see figure 4);

impacting the surface of the laminate by the conductive element (15), wherein said impacting forms a hole (14) in the laminate such that the entire conductive element provided in the providing step becomes embedded within the hole.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Curcio et al. (U. S. Patent 6,504,111) in view of Towle et al. (U. S. Patent 6,555,906).

Curcio et al. discloses a structure as shown in figures 4-7 comprising:

a first laminate (12A, column 2, line 36) having a first conductive element (20A, column 2, line 51) embedded into the first laminate (into a through hole (14A), wherein a portion of the first conductive element forms at least one contact pad (22A, 22B, column 2, line 59) extending beyond a surface of the first laminate;

a second laminate (12B) having a second conductive element (20B) embedded into the second laminate (into a through hole (14B), wherein a portion of the second conductive element forms at least one contact pad (22C, 22D) extending beyond a surface of the second laminate; and

a bonding layer (36) between the first and second laminates, such that the contact pads (22A, 22C) are electrical connected.

Curcio et al. does not disclose the bonding layer (36) made of conductive metal filled epoxy.

Towle et al. shows a laminated connector as shown in figures 1-8 having a bonding layer (116, column 3, line 55) made of metal filled epoxy (column 3, lines 55-58).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ a bonding layer made of metal filled epoxy in the structure of Curio et al, as taught by Towle et al, for the purpose of providing an electrical bonding connection and reducing heat between the laminated structure.

7. Claims 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lloyd ('523) in view of Watanabe et al. (U. S. Patent 5,319,159).

As to claim 21-24, Lloyd discloses the method of forming a conductive path within a laminate as shown in figures 1-6 comprising:

providing an opening or a hole (14, column 2, line 72) in the laminate (10, column 2, lines 65-67);

pressing a conductive element (15, column 3, line 9), which is a sphere or cylinder, into the opening (14) such that a portion of at least one end of the conductive element extends beyond a surface of the laminate (see figures 3-4);

applying a compressive pressure to the at least one end of the conductive element (column 3, lines 20-24) whereby the compressive pressure applied to the at least one end of the conductive element (15) forms a contact pad (35, 37, column 3, lines 37-38) extending beyond a surface of the laminate (10).

Lloyd dose not disclose the conductive element includes an inner element covered by an outer element.

Watanabe shows a conductive element (6, 9, see figure 1c, and 1f) including an inner element (9) cover by an outer element (6).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have teaching's Watanabe to employ the method of Lloyd in order to provide a strong bond of wiring patterns structure of a multiplayer circuit board.

8. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Reimann (497) in view of Lloyd (U. S. Patent 3,601,523).

Reimann does not teach the conductive element pressed into the opening of the laminate. Lloyd teaches a laminate (10) having an opening or a hole (14) wherein a conductive element (15) pressed into the opening (14) disclosed in figures 1-6, see column 3.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have teaching's Lloyd to employ the structure of Reimann in order to provide a low resistance through hole of a multiplayer structure.

9. Claims 29-30, 32, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reimann (497) in view of Curcio et al. (U. S. Patent 6,504,111).

Regarding claim 29, Reinman et al. discloses all of the limitations of the claimed invention, except for a top surface of the conductive pad coplanar with a top surface of the upper portion of the conductive element.

Curcio et al. shows in figure 3 having a top surface of the conductive pad coplanar with a top surface of the upper portion of the conductive element.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have teaching's Curcio (figure 3) in the structure of Reinman et al. for the purpose of providing directly electrical contact of a component to a laminate board.

Regarding claim 30, 32, and 35, Reinman et al. discloses all of the limitations of the claimed invention, except for part of the upper portion of the conductive element extending above the conductive pad, in direct mechanical contact with a top surface of the conductive pad, and not on the top surface of the conductive pad.

Curcio shows in figure 5 that a conductive element (20A) having an upper portion (17) extending above a top surface of a conductive pad (22A) in direct mechanical contact and not on the top surface of the conductive pad.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have teaching's Curcio (figure 5) in the structure of Reinman et al. for the purpose of providing electrically interconnection structure between layers of a multiplayer circuit board.

Response to Arguments

10. Applicant's arguments with respect to claims 21-24, 27-32, 35-39 have been considered but are moot in view of the new ground(s) of rejection.

Applicant argues:

Regarding claim 27, Reinman does not disclose "the power and upper portions comprise conductive material."

Regarding claim 37, Curcio does not disclose "the bonding layer comprises conductive metal filled epoxy."

Regarding claim 36, Lloyd does not disclose "applying compressive pressure...a surface of the laminate."

Regarding claim 38, Lloyd does not disclose "impacting the surface...embedded within the hole."

Regarding claim 21, Lloyd in view of Watanabe do not teach or suggest "applying compressive pressure...the surface of the laminate."

Examiner disagrees.

Response to an argument in claim 27, Reinman discloses the conductive material of the lower and upper portion of the conductive element (38) in figure 5 made of copper, see column 4, line 7.

Response to an argument in claim 37, Curcio discloses a conductive adhesive as a bonding layer having a metal filled epoxy. Also, examiner provides a new ground rejection of Curcio in view of Towle to show a utility of use the bonding layer can be made in such a metal filled epoxy.

Response to an argument in claim 36, Lloyd discloses an electrical conductor (15) forced into a hole (14) by a ram (17). This step is using the ram to pressure the conductor (15) and force into the hole (14), see column 3, lines 20-24.

Response to an argument in claim 38, Lloyd discloses the structure in figures 1-5 that the laminate (10) formed a hole (14) and impacting step of using conductor (15) forced and pressured into the hole (14) until its embedded into the hole, see column 3, lines 20-37.

Response to an argument in claim 21, since Lloyd is proper rejected the step "applying...laminate" as explained above. Therefore, claim 21 is moot under reject of section 103.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan T Dinh whose telephone number is 703-306-5856. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kammie Cuneo can be reached on 703-308-1233. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0658.

Tuan Dinh
January 23, 2004.

CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800